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Worn in or Worn out?: Cosmetic Wear and Attitudinal Responses to Materials

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Abstract

The aesthetics of material performance within design is typically only considered up to the point of sale, a false end state in which the 'newness' of the product is protected by the hermetic packaging in which it is sold. Beyond this, the 'ageing' of a material is thought of only in terms of utility or easily measured technical parameters such as durability or toughness, and rarely reflects upon, or accounts for, the users experiential relationship with the material. Here, we explore changes in tactile and visual perceptions when sample materials have been artificially aged through the application of a taxonomy of damage observed from real world products. This paper argues that to expand our current knowledge in material culture and to assist in providing a more nuanced understanding of the user's long-term relationship with materials, we, as designers, need to observe, record and reflect upon attitudinal reactions to aged and used materials.

Author Keywords

Material selection; ageing; cosmetic obsolescence; product lifetime extension; emotionally durable design.

ACM Classification Keywords

A.0. General: Conference Proceedings

Introduction

The relationship that we have with materials and their associated meaning is constructed from tangible interactions combined with the tacit semantic baggage of meanings that are defined by our collective material culture (Demirbilek & Sener, 2003; Dunne, 2005; Sudjic, 2008; Chapman, 2015). Current understanding of how material wear and damage fits into our lexicon of material meaning is anecdotal and not always "…a necessary design consideration to assist the extension of product life spans in graceful and socially acceptable ways."(Chapman, 2014, pp.141). In addition, if the concept of a "scratch-free world of slick polymers" (ibid) is synonymous with digital products, there is an implication that the materials that are used in analogue products are, given societal and semantic norms, more accepting of wear, for example the leather strap of a heirloom watch or the working surface of an old oak butchers block. In the case of electronic products wear has a detrimental effect on the appreciation of the materials when they are used in the outer casings of digital products (Fisher, 2004; Odom and Pierce, 2009) but again conclusions in the majority of current literature are primarily drawn from tacit and anecdotal evidence, not backed up with the rigour of an empirical study. There are some notable exceptions with Lilley et al., (2016) being the best case so far for assessments of material affect using repeatable scientific methods.

The current semantic language that is linked to user's perceptions of materials has been codified through a set of studies that explore, mainly, the tactile and visual characteristics of new, rather than aged, material samples (Pedgley, 2009; Karana and Hekkert, 2010; Rognoli, Karana,, 2014, Zuo et al., 2001), omitting consideration of the use phase of a product, where the material will inevitably suffer wear and tear from everyday use. This illustrates a large gap in knowledge where the meanings of materials and the products that are manufactured from these materials are understood only until the point of purchase. The majority of the life of the product is in use and it is during this period that significant changes to the meanings of materials and products take place. This paper explores this shortcoming.

Abrasion, Ablation, Impact and Accumulated Dirt

A Semantic Differential Method (Osgood, 1964) was utilised to explore the influence that wear and damage had on user's visual and tactile assessment of a selected range of material samples. These samples were created based on the variables of material and wear types of real world products, resulting in 30 samples. The material variables were grouped as follows; Plastic Gloss, Plastic Matte, Wood Gloss, Wood Matte, Metal and CLEVER[1]. For each set of six materials there were artificially aged versions for the four wear types that were elicited from a photographic study of real products being used in real time (Manley et al., 2015). These wear types were identified as Abrasion [scratching and rubbing], Ablation [removal of material by chipping], Impact [dent, breakage or splitting of material due to quick, large force] and Accumulated Dirt [accumulation of foreign material such as dust or sweat]. Alongside these a control set of samples were used in the study that had no wear. Figure 1 shows the full range of material samples that were used during the study.

[1] A novel material finish which, over time, wears to reveal different colored layers. Manufactured as part of the EPSRC funded Closed Loop Emotionally Valuable E-Waste Recovery (see www.clever-research.com and https://vimeo.com/147843561)

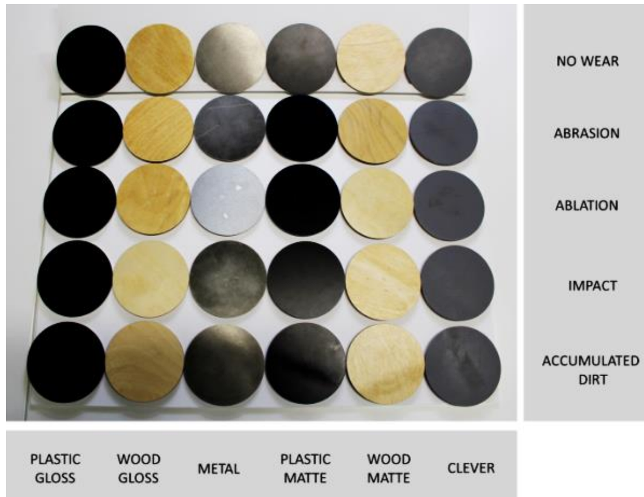

Figure 1: Material samples used in the semantic perception of materials study.

The batches of material samples were presented to n=35 participants by wear type, with No Wear presented first as the control to allow for comparisons to be made across wear types. Samples were assessed using seven Semantic Differential (SD) scales, as seen in Table 1.

SD Scale	Word Pairs	
1	Dislike	Like
2	Boring	Interesting
3	Ugly	Attractive
4	Hard	Soft
5	Old	New
6	Rough	Smooth
7	Aged Badly	Aged well

Table 1: Semantic differential scales used for semantic perception of materials study.

Results

The results indicate that there is a significant difference between the assessment of the tactile and visual properties of materials when there is a difference in the condition of the material. For example, if we look at SD scale 1 and SD scale 3, we can see some that the introduction of wear has a notable impact on participant appraisals of the material samples. Table 2 illustrates the differences in the appraisals of samples which have been artificially worn against those which are new*.

*The red and green boxes indicate that there has been a change in the assessment of the material sample given the introduction of a specific wear type. Blue boxes show that no change has occurred, which in itself is an interesting result as the introduction of wear type has not led to, as in the two cases of Dislike-Like and Ugly-Attractive, any difference in the assessment of the samples.

Semantic Differential Scale	**Material Sample**	**Abrasion against No Wear**	**Ablation against No Wear**	**Impact Against No Wear**	**Accumulated Dirt against No Wear**
Dislike - Like	Plastic Gloss	Abrasion less liked	Abrasion less liked	No Difference	Abrasion less liked
Dislike - Like	Plastic Matte	Abrasion less liked	Abrasion less liked	Abrasion less liked	Abrasion less liked
Dislike - Like	Wood Gloss	Abrasion more Liked	Abrasion more Liked	No Difference	Abrasion less liked
Dislike - Like	Wood Matte	Abrasion more Liked	Abrasion more Liked	No Difference	Abrasion less liked
Dislike - Like	Metal	Abrasion less liked	Abrasion less liked	No Difference	Abrasion less liked
Dislike - Like	CLEVER	Abrasion less liked	Abrasion less liked	No Difference	Abrasion less liked
Semantic Differential Scale	**Material Sample**	**Abrasion against No Wear**	**Ablation against No Wear**	**Impact Against No Wear**	**Accumulated Dirt against No Wear**
Ugly-Attractive	Plastic Gloss	Abrasion Uglier	Ablation Uglier	Impact Uglier	Acc. Dirt Uglier
Ugly-Attractive	Plastic Matte	Abrasion Uglier	Ablation Uglier	Impact Uglier	Acc. Dirt Uglier
Ugly-Attractive	Wood Gloss	No Difference	No Difference	Impact Uglier	No Difference
Ugly-Attractive	Wood Matte	No Difference	No Difference	Impact Uglier	No Difference
Ugly-Attractive	Metal	No Difference	No Difference	No Difference	No Difference
Ugly-Attractive	CLEVER	No Difference	No Difference	No Difference	No Difference

Table 2: Material sample appraisals across wear types within selected semantic scales

Discussion and Conclusion

If we are to progress an evolving knowledge of material semantics and material culture, we need to explore and refine our understanding of materials by including all the aspects of a material that include temporal influences of cosmetic changes during the use phase of a product/material. This study has illustrated that the ageing process, that includes the accumulation of wear and damage, has a distinct and notable influence on the user's appraisal of materials and the meanings that are ascribed to them. For example, our appreciation of material wear on surfaces such as wood, seem to be more accommodating of scratches and chips whereas the same material wear is seen as disadvantageous and less liked when found on plastic or metal materials. This does not necessarily mean that electronics and other products should all be manufactured from wood, but if the materials they do employ can emulate the characteristics of wood for accommodating wear and tear, then there are some significant consequences for product life extension. This evolving material semantic information is vital for designers and students of design to be aware of and incorporate into their design process. The benefit of starting the design process with an understanding of the material semantics of ageing redirects and re-sharpens our focus on designing a product that is designed for longevity and is therefore inherently more sustainable.

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References

1. Chapman, J., 2014. Meaningful stuff: Toward longer lasting products. *Materials experience: Fundamentals of materials and design*, pp.135-143.
2. Chapman, J., 2015. Hadal or epipelagic? The depths, and shallows, of material experience. *Product Lifetimes And The Environment*, p.57.
3. *CLEVER Research*. (2016). *Clever-research.com*. Retrieved 18 August 2016, from http://www.clever-research.com
4. Demirbilek, O. and Sener, B., 2003. Product design, semantics and emotional response. *Ergonomics*, *46*(13-14), pp.1346-1360.
5. Dunne, A., 2008. Hertzian tales: Electronic products, aesthetic experience, and critical design.
6. Fisher, T., (2004) What We Touch Touches Us: Materials, Affects and Affordances. Design Issues: Volume 20, Number 4.
7. Karana, E. and Hekkert, P., 2010. User-material-product interrelationships in attributing meanings. *International Journal of Design*, *4*(3).
8. Layers on Vimeo. Retrieved from https://vimeo.com/147843561. Accessed on 15 August 2016.
9. Lilley, D., Smalley, G., Bridgens, B., Wilson, G. T., & Balasundaram, K. (2016). Cosmetic obsolescence? User perceptions of new and artificially aged materials. *Materials & Design*, *101*, 355-365.
10. Manley, A.H.G., Lilley, D. and Hurn, K., 2015. Cosmetic wear and affective responses in digital products: towards an understanding of what types of cosmetic wear cause what types of attitudinal responses from smartphone users. Presented at: Product Lifetimes and the Environment (PLATE) Conference 2015, 17th-19th June 2015, Nottingham Trent University

11. Odom, W., Pierce, J., (2009), Improving with Age: Designing Enduring Interactive Products, CHI, April 4-9. Boston, MA, USA.
12. Osgood, C. E. (1964). Semantic differential technique in the comparative study of cultures. *American Anthropologist*, *66*(3), 171-200.
13. Rognoli, V. and Karana, E., 2014. Towards a new materials aesthetic based on imperfection and graceful ageing. *Materials experience: Fundamentals of materials and design*, pp.145-154.
14. Zuo, H., Hope, T., Castle, P., & Jones, M. (2001). An investigation into the sensory properties of materials. In *Proceedings of the International Conference on Affective Human Factors Design* (pp. 500-507).